CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report/Environmental Impact Statement

Supplemental Alternatives Analysis Report

Merced to Fresno Section High-Speed Train Project EIR/EIS

May 2011

CALIFORNIA High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

California High-Speed Train Project

Merced to Fresno Section

SUPPLEMENTAL ALTERNATIVES ANALYSIS REPORT

MAY 2011

Revision	Date	Description
1	4/29/11	Final

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1.0 SUPPLEMENTAL ALTERNATIVE ANALYSIS REPORT

This May 2011 Merced to Fresno Section Supplemental Alternatives Analysis (AA) Report updates the Preliminary AA Report that the California High-Speed Rail Authority (Authority) issued for the Merced to Fresno Section High-Speed Train (HST) Project in April 2010 and the subsequent Supplemental AA Report issued in August 2010.

This Supplemental AA Report was developed to present the engineering optimization resulting from a 15% level Value Engineering effort. The engineering revisions have led to reducing a number of potential impacts such as visual, noise, at-grade crossing safety improvements, and construction capital costs. These design optimizations were accomplished by:

- Setting Downtown Merced and Fresno stations and trackways to an at-grade profile.
- Optimizing the guideway profile to reduce the overall length of elevated structures (where feasible).

Throughout the course of the engineering design development and environmental evaluations, the design iterations that were developed and considered were measured against the HST design and environmental criteria established for the project. Several at-grade revisions were considered and discussed with local jurisdictions to ensure feasibility. Revisions presented in this report are the result of such revisions, which were determined to meet the project criteria, reduce environmental impacts, and reduce capital cost for construction.

1.1 Public Outreach and Agency Coordination

Since project initiation (November 2008), more than 108 presentations and briefings reached the following stakeholders:

- Elected Officials
- Chamber of Commerce
- Resource Agency Staff
- Planning and Transportation Agency Staff
- Economic Development Agency Staff
- City Councils & County Boards of Supervisors
- Local Irrigation & Farm Bureau Organizations
- Community and Business Organizations
- Trade Organizations
- Environmental Justice Groups
- Business Members

Since the last Supplemental AA briefing to the Board (August 2010), a total of 21 Technical Working Group and Public Outreach events were held.

1.2 Previously Concurred-Upon Preliminary Alignments

Per the previously submitted and concurred-upon Preliminary AA Report (April 2010) and Supplemental AA Report (August 2010), three alternatives, BNSF (A1), UPRR/SR 99 (A2), and Hybrid, were selected to advance through the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) process. The reasons for carrying them forward were stated as:

- Alternative – BNSF (A1)
  - Statewide Program EIR/EIS 2005, Preferred Alternative
  - BNSF Memorandum of Understanding established
  - Least constraints with UPRR
  - Supported by Madera County and the cities of Chowchilla and Madera
- Alternative – UPRR/SR 99 (A2)
  - Bay Area Program EIR/EIS 2008, Preferred Alternative
  - Possible challenges with UPRR
  - Broad base of support
  - Least ecosystem impacts
- Alternative – Hybrid
  - Potential to avoid/reduce impact on cities of Chowchilla, Fairmead, and Madera
  - One of the shortest alternatives/options
  - Less structural complexities
  - Lower cost
  - Less impact on farmlands

The concurred-upon alternatives included Henry Miller/Ave 24 and South SR 152 in the alternatives. Figure 1 illustrates the previously concurred-upon alignments.

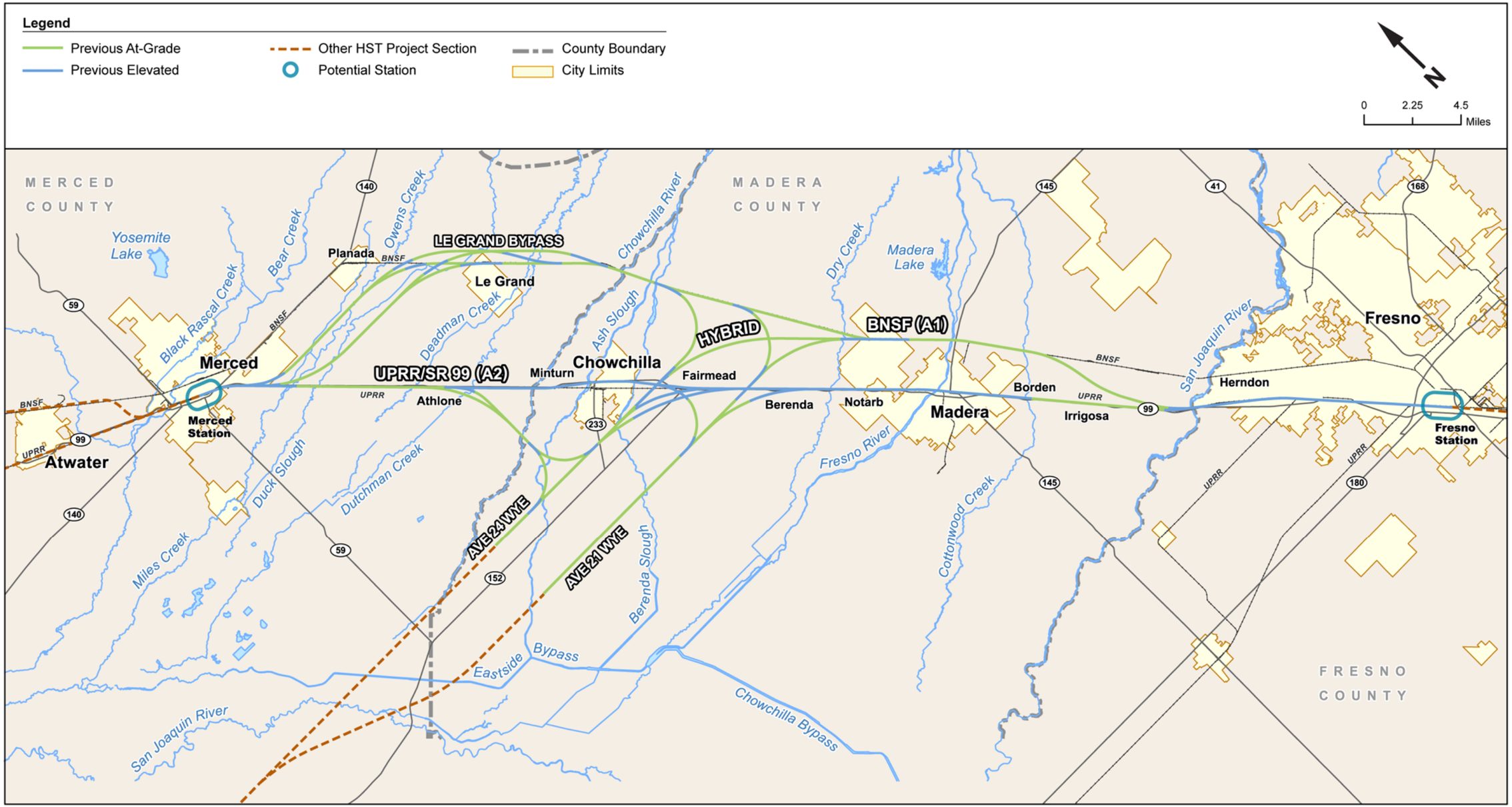

Figure 1
Previously Concurred-Upon Alternative Alignments

1.3 Alternative Optimizations

Through the Value Engineering effort and iterative design optimization process, the HST guideway design for the Merced to Fresno Section was further optimized to reduce project impacts by lowering the profile grade of the elevated structures to at-grade where feasible, and consequently reduce the broad community impacts caused by the elevated profile – specifically noise and visual intrusion impacts. In working with the communities, the changes have also resulted in cost savings. This effort applied the most recent project design criteria, as well as close coordination with local agencies, to identify potentially feasible traffic circulation solutions for at-grade conditions. Converting elevated HST structure alignments to at-grade conditions were considered at the following general areas:

- Downtown Merced and Fresno stations, where an at-grade station and approaching trackways were found to be feasible, with local street crossings
- Elevated structures on curve alignments, where recent design requirements allow for more efficient transition between elevated and at-grade sections

In the urbanized areas, the change in profile (from elevated to at-grade) reduces the distance of HST-related noise impacts. Noise generally travels in the line of sight. With an at-grade profile, noise would be buffered by adjacent developments, which would reduce noise levels in the areas behind these barriers. While there would still be a need to mitigate noise, the number of affected receptors is fewer. Additionally, several communities have voiced concerns over the elevated profile that may tower over adjacent land uses and park lands. An at-grade profile would be consistent with existing infrastructure, such as UPRR and BNSF, which these alternatives parallel.

1.3.1 Downtown Merced Station

The revised at-grade Merced high-speed rail station (location “C”) is located in the southeast portion of Downtown Merced, adjacent to the UPRR railway corridor. The HST alignment through Downtown Merced remains parallel to the UPRR railroad corridor between the railroad right-of-way to the northeast and West 15th Street to the southwest. The at-grade alignment would terminate at Martin Luther King, Jr. Way, and the Merced HST at-grade station would be located in a three city block section between Martin Luther King, Jr. Way to the northwest and G Street to the southeast. For the purpose of assessing environmental effects, the extents of the station facility are 16th Street (to the northeast), 14th Street (to the southwest), Canal Street (to the northwest), and G Street (to the southeast). This area, which encompasses the UPRR right-of-way and parking on two blocks bounded by Martin Luther King, Jr. Way, 14th Street, Canal Street, and 15th Street, occupies approximately 8 city blocks (approximately 40 acres).

The key features of the Downtown Merced at-grade station include the following:

- Average daily boardings at completion of Phase I: 7,900
- Gross (unconstrained) parking at completion of Phase I: 6,672 spaces, garage and surface parking
- Type of station: Dual side or island platform with 4-track trackway
- Platform length (length of station ”box”): 1,380 feet
- Combined width of platforms and trackway (width of station “box”): 150 feet

Figure 2 illustrates cross-sectional and schematic views of the at-grade Downtown Merced Station. These revisions have been developed in close coordination with the City of Merced to ensure the feasibility of the at-grade station, along with additional roadway modifications to mitigate traffic circulation impacts. The current design alternative includes a 2- or 4-lane overcrossing at G Street over the UPRR and the HST to maintain G Street traffic.

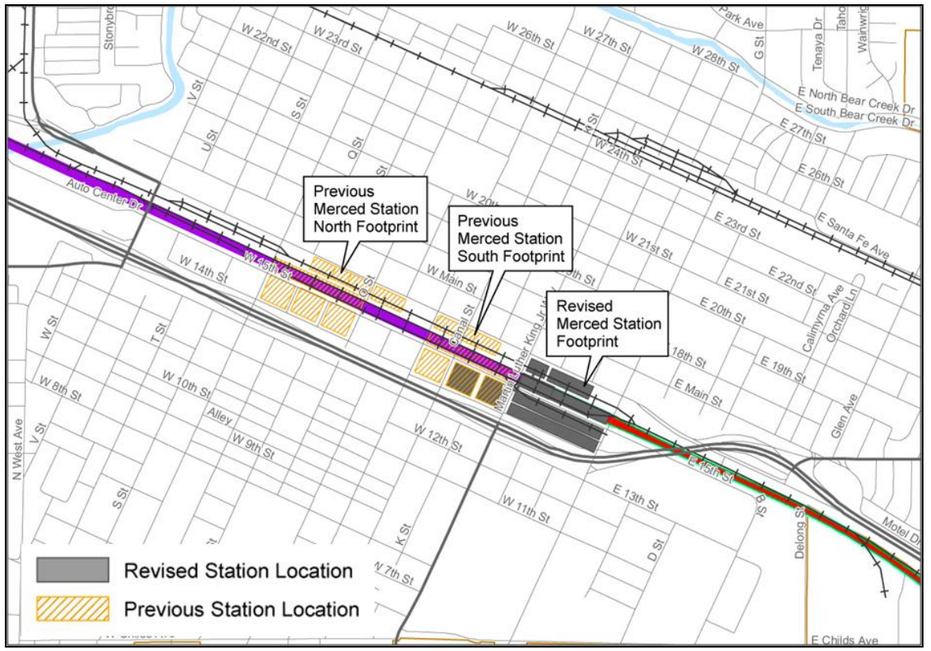

Figure 2
Revised Merced Station Location

1.3.2 Downtown Fresno Station

In parallel with the optimization effort for the Merced to Fresno Section of the HST project, the Fresno to Bakersfield (FB) Section also considered similar measures to reduce impacts and construction costs for the FB alignment alternatives and the Downtown Fresno Station. There are two proposed station alternatives, both of which are at-grade with pedestrian overcrossings over the UPRR tracks as necessary to provide access to either side of Fresno.

Figure 3 shows two newly developed Fresno station alternatives that are at-grade. As shown in the site plans, the station alternatives are located near Mariposa Street and Kern Street. To accommodate these stations at-grade, Divisadero Street would be closed, Ventura will be an over-crossing, and Tulare Street will be either an under- or an over-crossing. The remaining streets would continue to be closed (Inyo, Kern, and Mariposa Streets), or there would be modifications to the existing undercrossings (Fresno, Tuolumne, and Stanislaus Streets). Please refer to the Fresno to Bakersfield Section Supplemental AA report for more detail.

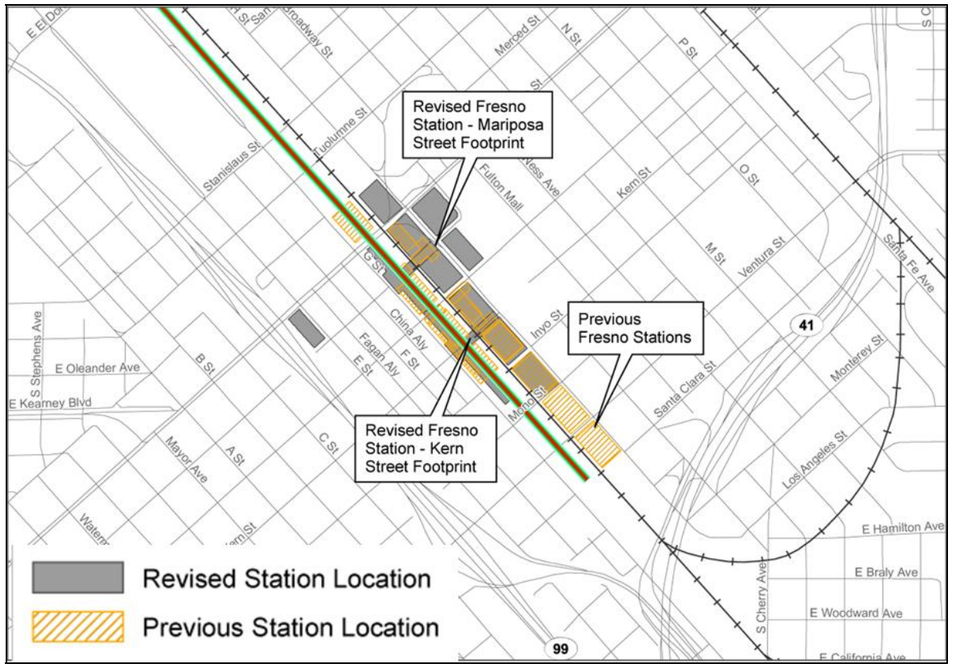

Figure 3
Revised Fresno Station Location

1.3.3 Profile Optimization from Elevated Structures to At-Grade

During the early preliminary engineering stages, in some cases, longer elevated HST profiles were conservatively used at the transitions to the curved alignments. As part of the design review process, more refined profile transitions were considered and found to be feasible. This will reduce visual and noise impacts, and will also reduce the capital cost for construction of the HST project.

The design approach was only applied at isolated sections where, from the engineering perspective, the profile adjustment was found to be acceptable. Figures 4a through 4c show the portions of the BNSF, UPRR/SR 99, and Hybrid alternative alignments where the revised profiles have changed from elevated to at-grade.

Table 1 summarizes the lengths of elevated and at-grade segments for the three alternatives, as they were previously, and compares them to the profile configurations of the revised profiles.

Table 1
Alignment Profile Comparison of Previous and Revised Designs

Alternative	UPRR/SR 99				BNSF							
Design Option	East Chowchilla Design Option		West Chowchilla Design Option		Mariposa				Mission			
					Le Grand		East of Le Grand		Le Grand		East of Le Grand	
Wye Connection Option	Ave 24	Ave 21	Ave 24	Hybrid	Ave 24	Ave 21	Ave 24	Ave 21	Ave 24	Ave 21	Ave 24	Ave 21
15% Design Prior to Profile Optimization												
Total length	96	92	81	82	102	99	102	99	102	99	102	99
At-grade	41	42	36	50	66	65	65	64	65	65	64	63
Elevated (incl. retained fill)	55	50	45	31	36	34	37	35	36	34	38	36
15% Design After Profile Optimization												
Total length	95	91	80	80	101	98	101	98	100	98	100	98
At-grade	50	51	45	63	75	74	74	74	74	74	73	72
Elevated (incl. retained fill)	45	40	35	18	26	24	26	25	26	24	27	25

Notes:
1. Lengths (in miles) are measured for single, dual, and/or four-track sections;.
2. Lengths listed are based on current 15% design level quantities
3.Reduction of lengths are due to relocation of Merced Station, and Wye connection design Optimizations

Adjustments to Infrastructure

The revised design concepts have been developed in close coordination with the jurisdictions where the at-grade HST guideways might cause additional traffic circulation impacts. There are primarily two areas where roadway adjustments are necessary to accommodate the at-grade profile—Merced and south of the San Joaquin River to the Fresno station in north Fresno.

In Merced, the current design eliminates at-grade crossing at G streets and provides a new 2- or 4-lane overcrossing over the UPRR and the HST to maintain G Street traffic. Additionally an at-grade crossing of UPRR at D street will be closed and a new pedestrian bridge in the Vicinity of B street will be considered.

Traveling south of the San Joaquin River (as shown in Figure 5), the HST profile has been revised to become at-grade after Herndon Avenue. From there to the Ashlan overcrossing and interchange, the at-grade HST guideway will require realignment of Golden State Boulevard and closure of two important at-grade crossings, one at Carnegie Avenue and one at Shaw Avenue. In coordination with the City of Fresno, it was determined that an initial phase of a future project at Veterans Boulevard can provide an alternate grade-separated crossing close to the existing Carnegie Avenue location. This Veterans Boulevard Phase 1 project, as shown in Figure 5, has now become part of the HST project. To ensure timely construction of this Phase 1 project, an agreement between the City of Fresno and the Authority will be in place. At Shaw Avenue, a new grade-separated crossing will be provided to connect to Golden State Boulevard via North Cornelia Avenue or West Santa Ana Avenue, as shown in Figure 5.

Farther south, a previous design option to realign SR 99 and make room for the HST right-of-way will still be valid; however, the HST alignment will cross under new overcrossings at Ashlan and Clinton Avenues. This option will require additional coordination with Caltrans.

South of Clinton to Fresno Station options, additional grade crossings will also be closed and a new railroad undercrossing will be provided. In Fresno, eight existing at-grade crossings will be closed: Carnegie, Shaw, McKinley, W. Olive, Tulare, Kern, Mono, and Ventura.

1.4 Agency Feedback

Early and ongoing coordination efforts with the Cities of Merced and Fresno, and Caltrans have shown progress toward defining solutions for the HST project with the proposed revision to the profiles (i.e., reduce elevated structures). Coordination with UPRR and BNSF freight rail agencies also continue.

Table 2
Early Agency Feedback to Revised Design Considerations

Involved Agencies	Early Feedback
City of Fresno	With additional overcrossings, City of Fresno is in support
City of Merced	With additional overcrossing, City of Merced is in support
Caltrans	No Change to SR99 realignment. Continuing coordination
UPRR/BNSF	Continuing coordination

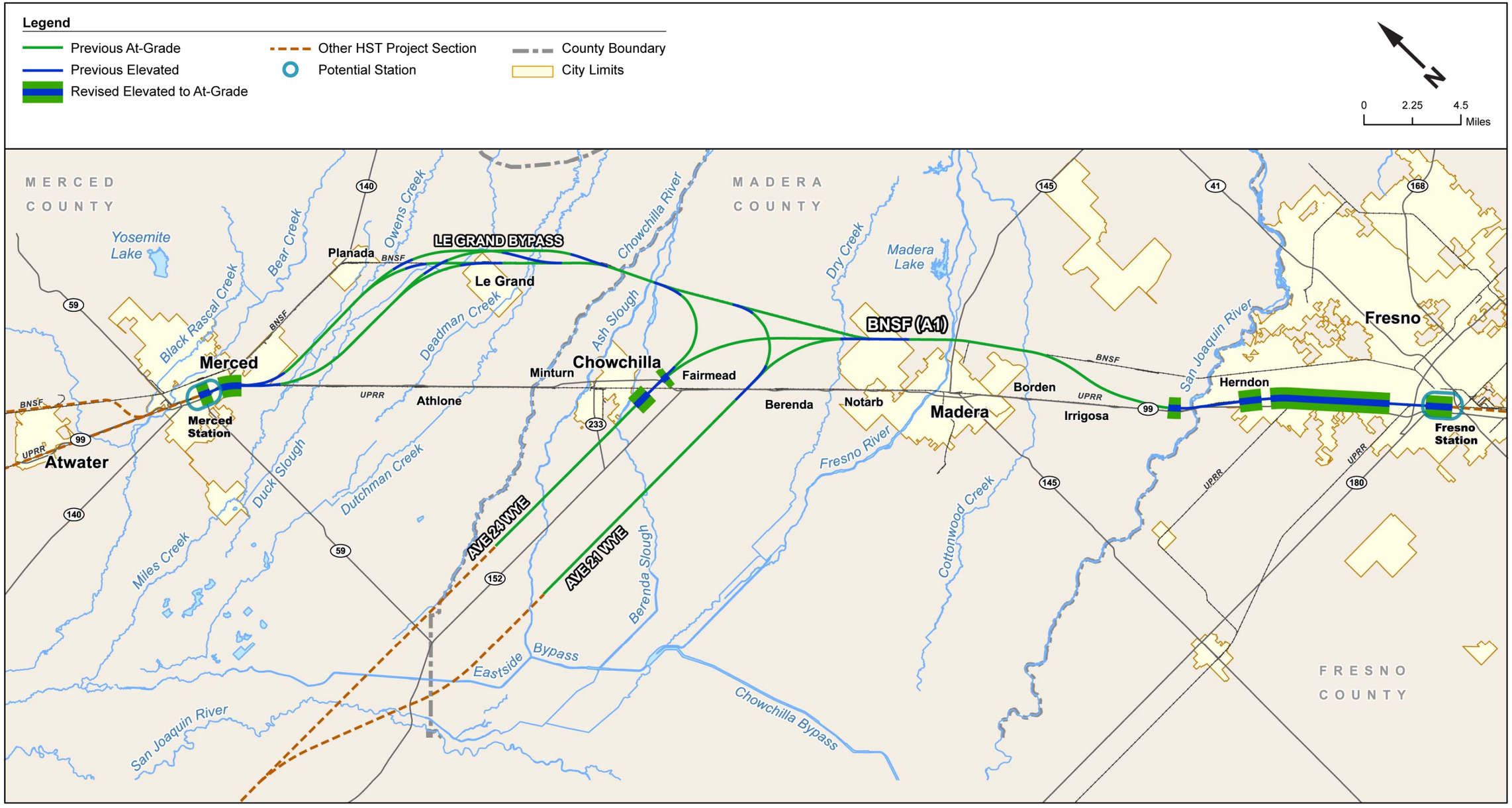

Figure 4a
Revised Profile Design for the BNSF (A1) Alternative

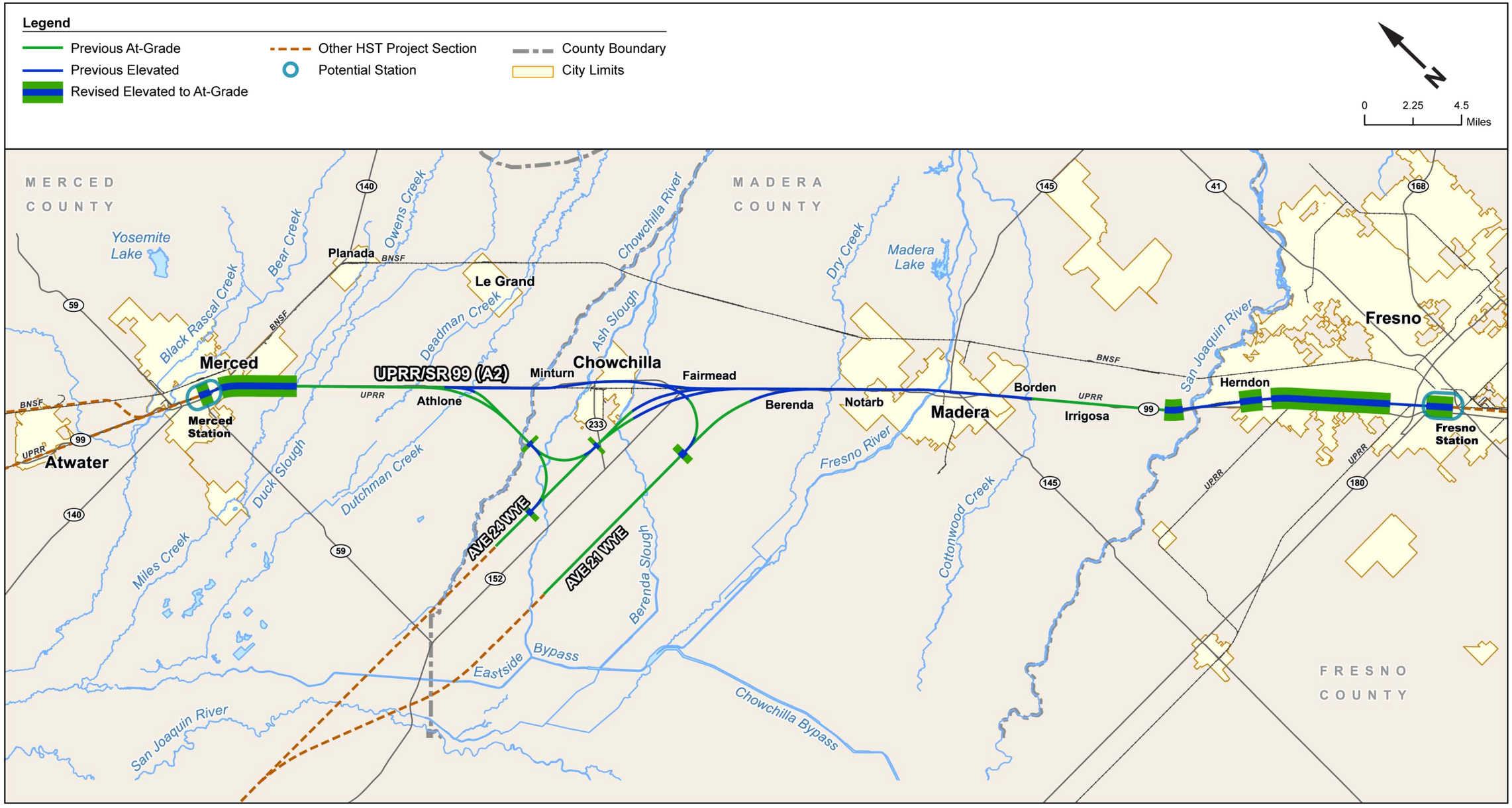

Figure 4b
Revised Profile Design for the UPRR/SR 99 (A2) Alternative

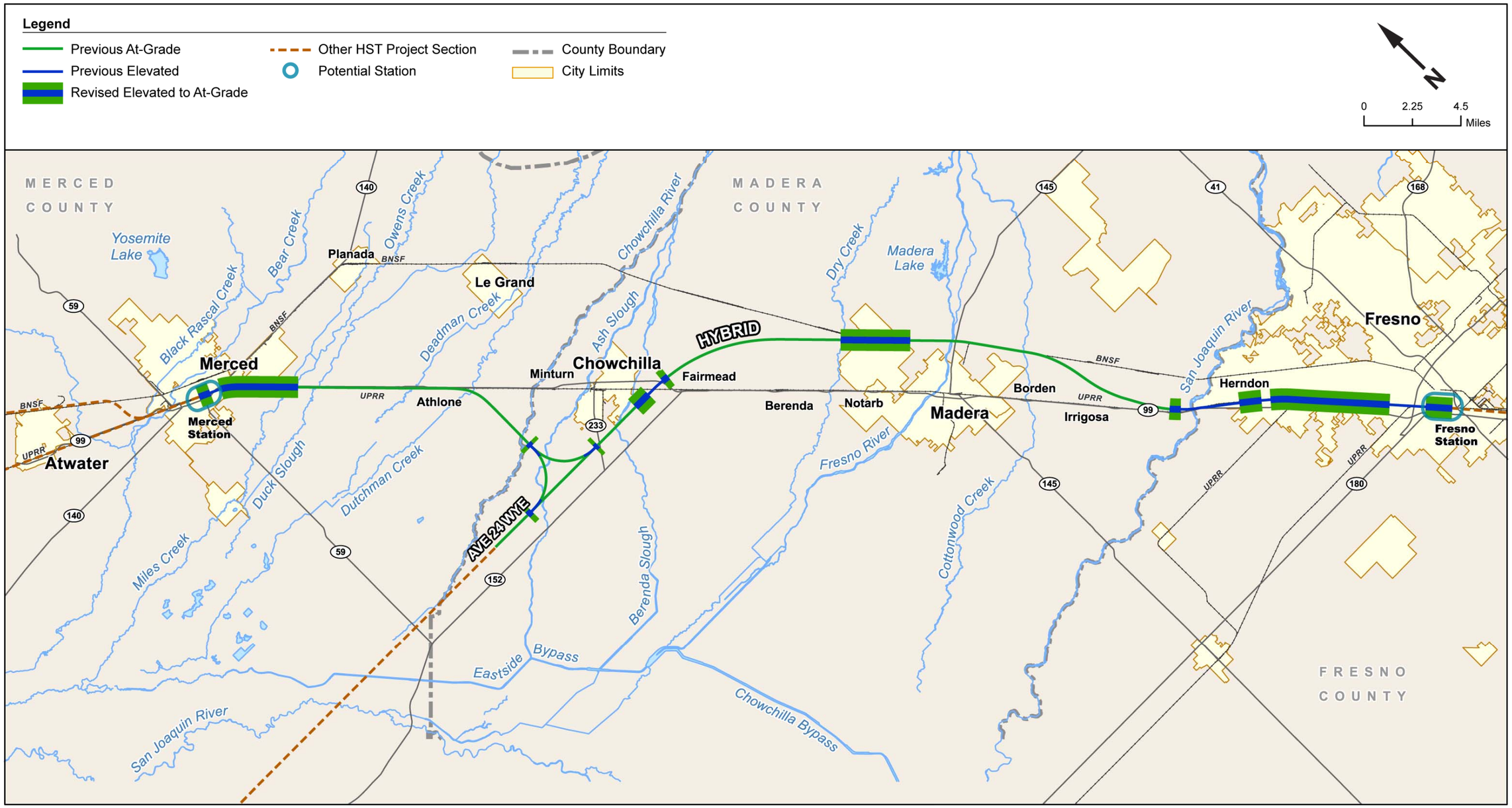

Figure 4c
Revised Profile Design for the Hybrid Alternative

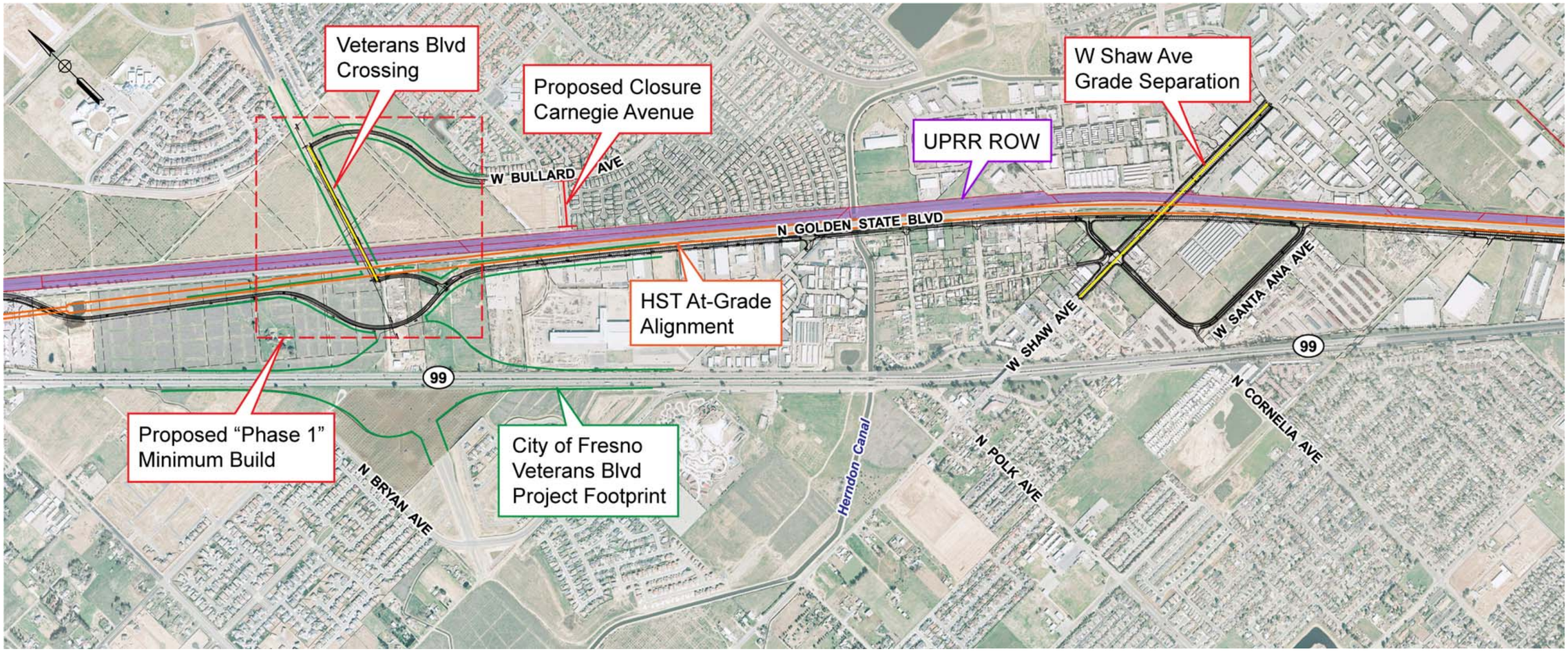

Figure 5
Veterans Boulevard Phase 1 Project

2.0 RECOMMENDATIONS

The staff makes the following recommendations to the Board (a checkmark indicates carry forward and an "x" indicates do not carry forward). These recommendations are illustrated in Figure 6.

Downtown Merced and Fresno Stations

✓ Carry forward at-grade stations

x Do Not Carry forward elevated stations

Elevated Structures to At-Grade

✓ Carry forward profile optimization to reduce elevated structures and increase at-grade segments.

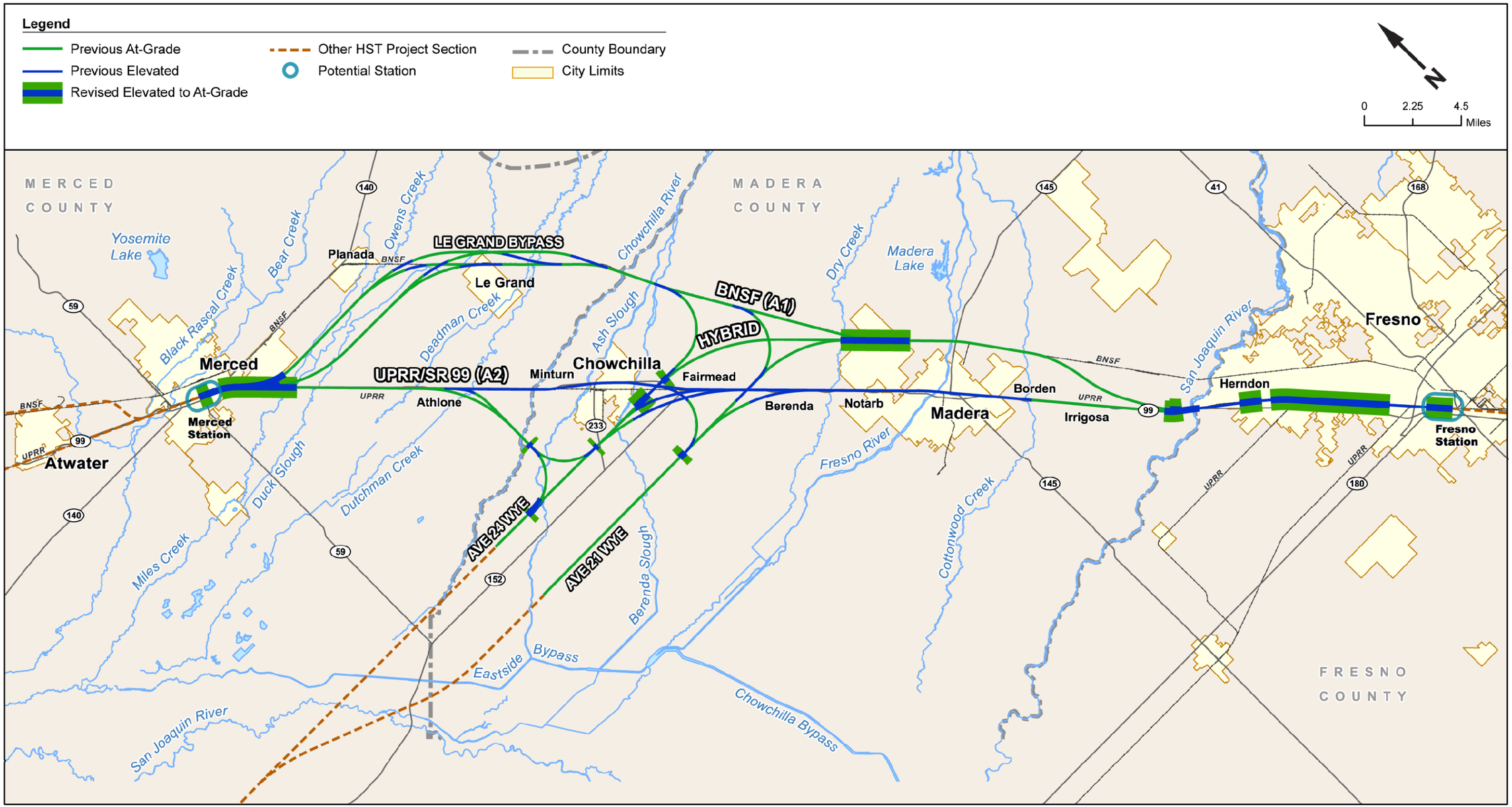

Figure 6
Revised Alternative Profiles for the Merced to Fresno Section